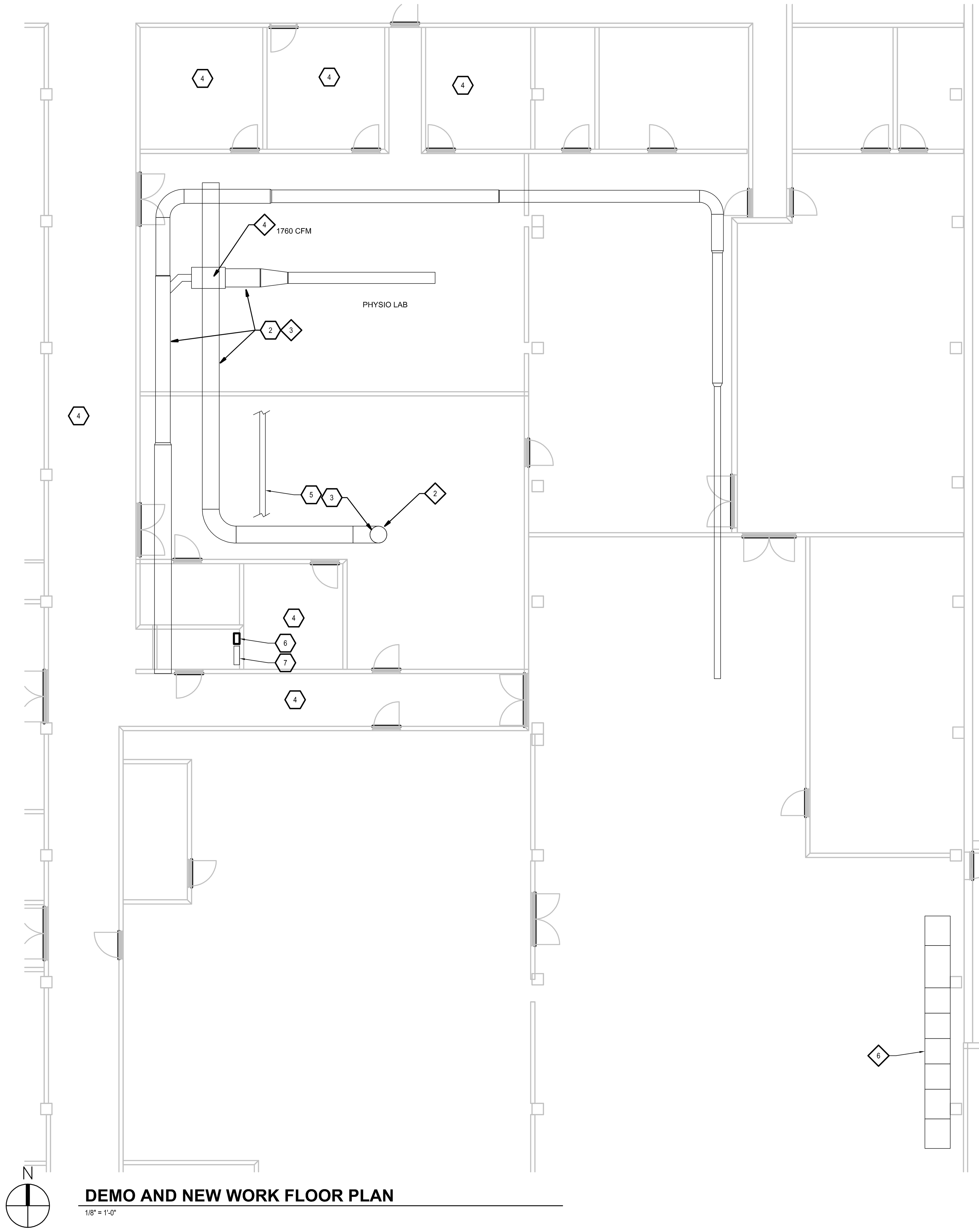
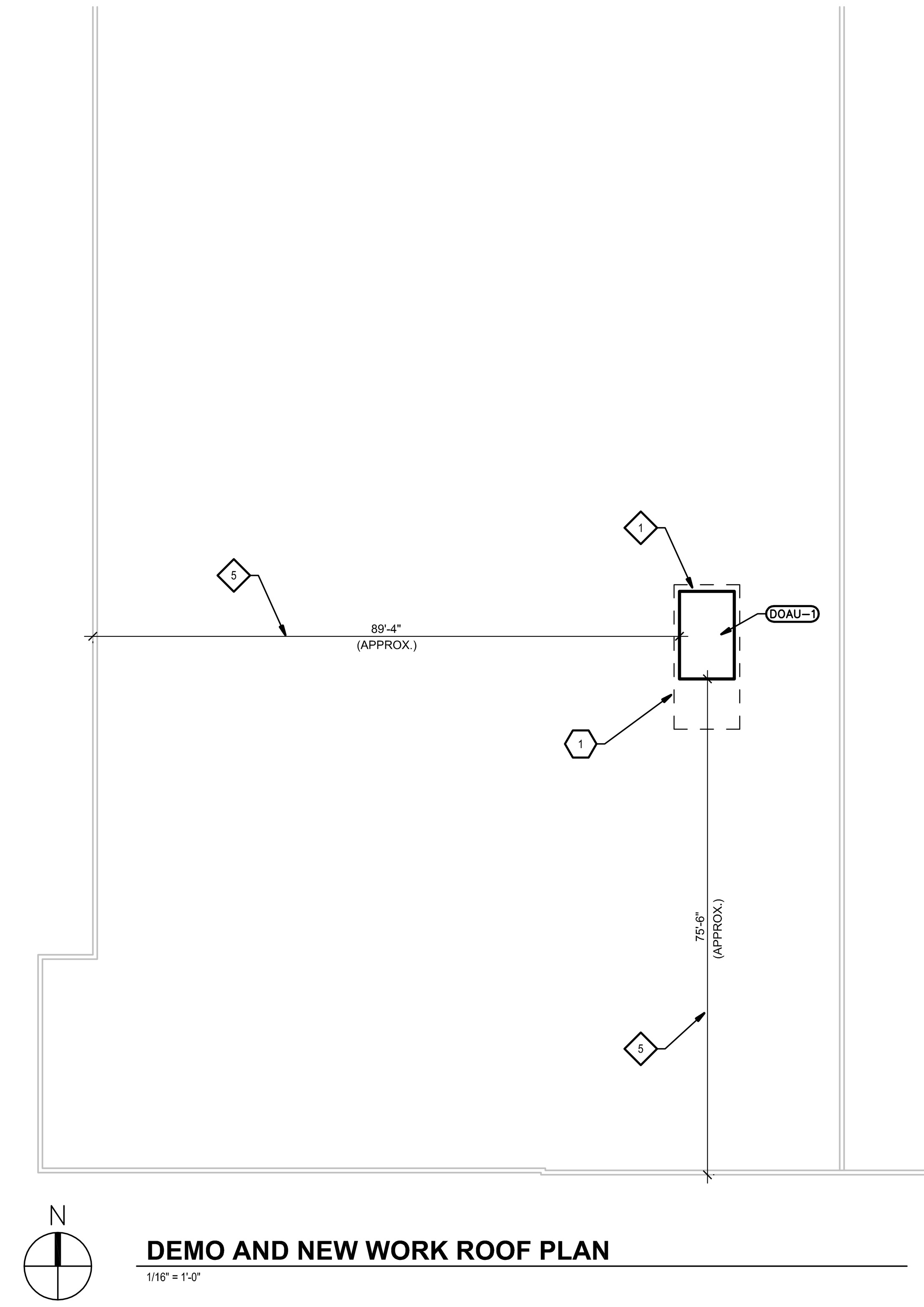


DEMO AND NEW WORK FLOOR PLAN

1/8" = 1'-0"



DEMO AND NEW WORK ROOF PLAN

1/16" = 1'-0"

GENERAL MECHANICAL NOTES

1. LIGHT LINES INDICATE EXISTING PIPING, DUCTWORK, EQUIPMENT, ETC. TO REMAIN. BOLD LINES INDICATE PIPING, DUCTWORK, EQUIPMENT, ETC. TO BE INSTALLED THIS CONTRACT UNLESS NOTED OTHERWISE.
2. COORDINATE ROUGH-IN AND FINAL LOCATION OF DUCTWORK AND PIPING WITH LIGHTING, STRUCTURE, SPRINKLER, ETC. PROVIDE OFFSETS AND/OR EASEMENTS, OR RELOCATE AS REQUIRED TO AVOID CONFLICTS WITH WORK OF OTHER TRADES.
3. INSTALL MANUAL VOLUME DAMPERS IN ALL SUPPLY, RETURN AND EXHAUST DUCT SYSTEMS AS REQUIRED FOR CONTROLLING AIR VOLUMES TO TRUNK DUCTS, BRANCH DUCTS, OUTLETS AND INLETS. CONTRACTOR SHALL INSTALL A COMPLETE SYSTEM OF DAMPERS AS REQUIRED FOR BALANCING AIR SYSTEMS.
4. PROVIDE TEMPORARY FILTRATION ON RETURNS DURING CONSTRUCTION TO PREVENT DUST FROM SPREADING TO DUCTWORK, HVAC EQUIPMENT AND NON CONSTRUCTION AREAS.
5. PIPING IS SHOWN IN SCHEMATIC FORM, ROUTE AS REQUIRED FOR CLEARANCE. VERIFY ROUTING AND CLEARANCES AND COORDINATE WITH OTHER TRADES PRIOR TO FABRICATION.
6. BREAK CONNECTIONS ARE REQUIRED AT ALL MAJOR EQUIPMENT AND ALL PIPING ITEMS THAT REQUIRE REMOVAL FOR MAINTENANCE.
7. PIPE REDUCTIONS ON HORIZONTAL PIPING GOING FROM LARGER TO SMALLER SHALL BE MADE WITH ECCENTRIC REDUCERS: TOP FLAT FOR LIQUID SYSTEMS. CONCENTRIC REDUCERS MAY BE USED FOR FLOW GOING FROM SMALL TO LARGER SIZE PIPE.
8. FIRE SAFE ALL PIPE PENETRATIONS PER UL AT RATED WALLS.
9. THERMOSTATS SHALL BE MOUNTED 4'-0" ABOVE FINISHED FLOOR.
10. NEW FLOOR/WALL/CEILING PENETRATIONS REQUIRED FOR MECHANICAL PIPING INSTALLATION SHALL BE CLEANLY BORED AT RIGHT ANGLES. AS NEW PIPING IS INSTALLED, NEW PIPING PENETRATIONS SHALL BE NEATLY CAULKED TO FILL VOID. WALL PENETRATIONS SHALL BE FINISHED WITH ESCUTCHEONS.
11. ALL NEW PIPING EXPOSED IN OCCUPIED SPACES SHALL HAVE PVC JACKETS INSTALLED OVER THE PIPING INSULATION. ANY PIPING REQUIRED TO BE EXPOSED SHALL BE INSTALLED VERTICALLY OR HORIZONTALLY IN LEAST VISIBLE LOCATIONS.
12. ALL NEW EQUIPMENT AND ACCESSORIES (CIRCUIT SETTERS, CIRCULATION PUMPS, EXPANSION TANKS ETC.) SHALL BE INSTALLED SO AS TO BE EASILY ACCESSIBLE.
13. ALL CONDENSATE PIPING SHALL BE SLOPED 1/8" PER FOOT MINIMUM (TYP.).
14. PROVIDE HOUSEKEEPING PADS UNDER ALL FLOOR MOUNTED EQUIPMENT.
15. WHERE DUCT IS HELD TIGHT TO STRUCTURE, CLIP ALL ROOFING NAILS TO PROTECT DUCT/ DUCT INSULATION.
16. COORDINATE NEW WORK OF ALL UTILITIES TO REDUCE DOWNTIME, I.E.; EQUIPMENT, CHILLED WATER, STEAM, CONDENSATE, ELECTRICAL. PROVIDE OWNER 48 NOTICE OF ANY SCHEDULED DOWNTIME.

DEMOLITION REFERENCE NOTES

1. REMOVE EXISTING ROOFTOP UNIT. DEMOLITION SHALL INCLUDE ALL UTILITY CONNECTIONS TO EXISTING UNIT. PREPARE EXISTING UTILITIES FOR CONNECTION TO NEW UNIT SHOWN ON NEW WORK PLAN.
2. EXISTING DUCTWORK SYSTEMS SHALL REMAIN IN PLACE. CONTRACTOR TO CLEAN DUCTWORK PRIOR TO CONNECTIONS TO NEW EQUIPMENT.
3. PREPARE EXISTING DUCT FOR NEW CONNECTION TO NEW UNIT.
4. NO WORK THESE AREAS.
5. PLUG-IN BUSWAY WITH TAP SERVING EXISTING MAU. TURN SWITCH OFF AND MARK AS "SPARE".
6. VFD SERVING EXISTING MAU. REMOVE VFD, COORDINATE DISPOSAL WITH OWNER. PROVIDE JUNCTION BOX ON LINE SIDE CONDUIT, CAP CONDUCTORS, SECURE WITH A BLANK COVER, MARK BOX "FEEDER FROM SPARE SWITCH ON BUSWAY IN ADJACENT ROOM. REMOVE LOAD SIDE CONDUCTORS FROM CONDUIT, RETAIN CONDUIT FOR INSTALLATION OF FEEDER TO REPLACEMENT MAU.
7. EXISTING EXHAUST FAN STARTER AND METASYS CONTROLS TO REMAIN.

NEW WORK REFERENCE NOTES

1. COORDINATE LOCATION OF NEW UNIT WITH EXISTING ROOF OPENINGS. PROVIDE NEW CURB OR EXTENSION TO COVER EXISTING UNUSED CURB.
2. COORDINATE EXACT LOCATION OF DUCTWORK PENETRATION THROUGH FLOOR PRIOR TO UNIT INSTALLATION. PROVIDE DUCTWORK TRANSITIONS FROM EXISTING DUCT SIZE TO NEW UNIT CONNECTION SIZES.
3. CLEAN EXISTING DUCTWORK PRIOR TO START-UP OF NEW EQUIPMENT. EXHAUST DUCTWORK SHALL BE CLEANED TO THE EXISTING FANS, SUPPLY DUCTWORK SHALL BE CLEANED TO NEAREST MAIN BRANCH, AND OUTDOOR AIR DUCTWORK SHALL BE CLEANED ENTIRE DUCT RUN.
4. CONTRACTOR SHALL REBALANCE EXISTING VAV BOX AT THE CONCLUSION OF PROJECT.
5. DIMENSIONS PROVIDED FOR SCALE OF WORK. CONTRACTOR TO VERIFY UNIT INSTALLATION, INCLUDING ALL REQUIRED SERVICE, ACCESS AND MAINTENANCE CLEARANCES REQUIRED PRIOR TO INSTALLATION.
6. EXISTING 480V/3 SWITCHGEAR - PROVIDE (3) 50A FUSES TO BE INSTALLED IN UNUSED SWITCH MARKED "RADIO SHOP REHEAT". EXTEND 3-#6, #10 GND, 1"C FROM SWITCH TO MAU ON ROOF. UTILIZE EXISTING CONDUIT (DEMO NOTE #6) FOR FINAL PATHWAY TO MAU TO AVOID NEW PENETRATIONS THROUGH THE ROOF.

DEDICATED OUTDOOR AIR UNIT WITH PACKAGED DX COOLING AND STEAM HEATING SCHEDULE

PLAN MARK	SERVES	SUPPLY FAN DATA (100% OUTDOOR AIR) TOTAL AIR FLOW CFM	ESP IN WG	TSP IN WG	MOTOR DATA BHP	MOTOR DATA HP	COOLING - DX EAT (°F) DB	EAT (°F) WB	LAT (°F) DB	LAT (°F) WB	CAP (MBH) SENS	CAP (MBH) TOTAL	EER	HEATING - STEAM EAT (°F)	LAT (°F)	FUEL	PRESS. (LB)	COND.	ELECTRICAL DATA VOLTS	Ø	FLA	MOP	DESIGN BASIS	MODEL	COOLING EFFICIENCY (EER)	WEIGHT LBS
DOAU-1	PHYSIO LAB	8000	0.4	2.31	4.33	7.5	95	75	68.0	66.8	231.4	242.4	11.8	-10	79.6	STEAM	15	1033	460	3	39	50	AAON	RN-016	11.8	2693

NOTES:
1. THE FOLLOWING APPLIES TO ALL OF THE ABOVE UNITS.
   A. ALL MOTORS SHALL BE NEMA PREMIUM EFFICIENT.
   B. PROVIDE VFDS PER ELECTRICAL SPECIFICATIONS. VFDS SHALL BE FURNISHED AND FACTORY INSTALLED BY UNIT MANUFACTURER.
   C. PROVIDE SINGLE POINT ELECTRICAL CONNECTION. MANUFACTURER TO PROVIDE DISCONNECT.
   D. COORDINATE STEAM CONNECTION SIZING WITH EXISTING CONDITIONS.
   E. UNIT SHALL BE BASED ON AAON. CONTRACTOR SHALL SUBMIT ANY POTENTIAL ALTERNATE MANUFACTURERS TO ENGINEER FOR APPROVAL.
   F. UNIT SHALL BE INSTALLED OVER EXISTING UNITS CURB. CONTRACTOR SHALL VERIFY EXTENT OF CURB EXTENSION AND BLANK OFF PANELS REQUIRED TO COVER EXISTING OPENING PRIOR TO ORDERING.
   G. COORDINATE EXISTING STEAM PIPING SIZING, AND ANY ADDITIONAL TAPS, TRAPS OR VALVES REQUIRED TO CONNECT TO EXISTING SYSTEM.

SPECIFICATIONS

1. GENERAL MECHANICAL REQUIREMENTS:
1.1. MECHANICAL CONTRACTOR SHALL PROVIDE ALL MATERIALS, LABOR, EQUIPMENT, AND TESTING AS REQUIRED FOR THE COMPLETE AND OPERABLE INSTALLATION OF MECHANICAL EQUIPMENT AND RELATED WORK. THE MECHANICAL CONTRACTOR SHALL OBTAIN AND PAY ALL FEES, PERMITS, AND LICENSES REQUIRED FOR HIS WORK. ALL WORK SHALL BE IN ACCORDANCE WITH STATE AND LOCAL CODES AND NFPA. THE CONTRACTOR SHALL BE RESPONSIBLE FOR AND COORDINATE THE WORK OF ANY SUBCONTRACTORS FOR THIS PROJECT.
1.2. COORDINATE WITH THE GENERAL CONTRACTOR AND THE OWNER'S DESIGNATED REPRESENTATIVE FOR THIS PROJECT. WORK SHALL BE SCHEDULED TO MINIMIZE INTERRUPTIONS TO THE OWNER'S OPERATIONS. PROVIDE PROTECTION FOR EQUIPMENT AND MATERIALS TO BE INSTALLED AS A PART OF THIS PROJECT AS WELL AS THE OWNER'S EQUIPMENT AND FACILITIES.
1.3. ALL MATERIALS SHALL BE NEW UNLESS INDICATED OTHERWISE. WORK SHALL BE PERFORMED BY SKILLED TRADESMEN. ALL MATERIAL, EQUIPMENT, AND SYSTEMS SHALL BE KEPT IN REPAIR AND PROPER OPERATING CONDITION UNTIL FINAL ACCEPTANCE BY THE OWNER'S DESIGNATED REPRESENTATIVE. WARRANTY ALL MATERIALS AND WORKMANSHIP FOR A PERIOD OF ONE (1) YEAR FROM DATE OF FINAL ACCEPTANCE BY THE OWNER'S REPRESENTATIVE.
1.4. PROVIDE FOR THE PROTECTION OF EQUIPMENT AND MATERIALS TO BE INSTALLED AS PART OF THIS PROJECT. PROTECTION SHALL BE REQUIRED FOR THE OWNER'S EXISTING EQUIPMENT AND FACILITIES TO PREVENT DAMAGE. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE PATCHING, REPAIR, AND PAINTING OF ALL WALLS, FLOORS, ETC. DAMAGED AS A RESULT OF CONTRACTOR'S OPERATIONS. REPAIR, PATCHING, AND PAINTING, AS REQUIRED, SHALL BE PERFORMED BY THE RESPECTIVE TRADES TO MATCH EXISTING CONSTRUCTION.
1.5. THE CONTRACTOR SHALL FIELD VERIFY EXISTING CONDITIONS AND EQUIPMENT PRIOR TO BEGINNING WORK. WORK MAY NEED TO BE SCHEDULED AT NIGHT AND DURING WEEKENDS TO MINIMIZE INTERRUPTIONS TO THE OWNER'S OPERATIONS. COORDINATE WORK SCHEDULE WITH THE OWNER'S REPRESENTATIVE.
1.6. SUBMIT THREE (3) COPIES OF SHOP DRAWINGS, MANUFACTURER'S EQUIPMENT DATA SHEETS, AND PERFORMANCE DATA FOR APPROVAL. SUBMIT ON ALL MATERIAL SPECIFIED.

2. PIPING:
2.1. DRAWINGS INDICATE APPROXIMATE ROUTING OF PIPING AND DO NOT INCLUDE ALL OFFSETS, FITTINGS, VALVES, ETC. CONTRACTOR TO FIELD VERIFY EXISTING PIPE SIZES, LOCATION, AND SERVICE PRIOR TO FINAL CONNECTION. LIGHT LINES INDICATE EXISTING PIPING AND EQUIPMENT TO REMAIN. BOLD LINES INDICATE WORK THIS CONTRACT UNLESS NOTED OTHERWISE. COORDINATE ROUGH-IN AND FINAL LOCATIONS OF NEW AND RELOCATED PIPING WITH EXISTING STRUCTURE, NEW STRUCTURE, PIPING, SPRINKLER, DUCTWORK, LANDSCAPING, ETC. PROVIDE OFFSETS AS REQUIRED TO AVOID CONFLICTS WITH WORK OF OTHER TRADES. PROVIDE CHROME-PLATED ESCUTCHEONS WHERE PIPES PENETRATE WALLS.
2.2. GENERAL PIPING: INSTALL DIELECTRIC UNIONS BETWEEN ALL LOCATIONS WHERE DISSIMILAR METALS ARE JOINED. FIRESTOP ALL NEW OR EXISTING PIPING PENETRATIONS THROUGH THE FLOORS AND FIRE RATED WALLS. PROVIDE PIPE HANGERS TO SUPPORT AND SECURE PIPE AND TO PREVENT VIBRATION. PIPE HANGER MATERIAL SHALL MATCH PIPE. WHERE HANGERS ARE ATTACHED TO CONCRETE OR OTHER STRUCTURAL MEMBERS, TAKE CARE TO AVOID DAMAGE OR WEAKENING OF THE STRUCTURE. PROVIDE SLEEVES WHERE PIPING PENETRATES FLOORS AND WALLS. PROVIDE GALVANIZED OR CAST IRON PIPE SLEEVES WHERE PIPING PENETRATES LOAD-BEARING WALLS. SLEEVE SHALL BE SIZED TO ACCOMMODATE PIPE AND INSULATION. PROVIDE FIRE PROOFING WHERE PIPES PENETRATE FIRE RATED PARTITIONS.
2.3. ABOVE GROUND STEAM PIPING SHALL BE SCHEDULE 40 BLACK STEEL PIPE, ASTM A53. FITTINGS FOR THREADED PIPE SHALL BE MALLEABLE IRON FITTINGS, 125 POUND STANDARD FLAT BAND WATER PATTERN. JOINTS FOR THREADED PIPE SHALL BE MADE USING APPROVED PIPE JOINT COMPOUND, APPLIED TO MALE THREADS ONLY. CUT PIPES SQUARE, CUT THREADS CLEAN, REMOVE BURRS, AND REAM ENDS TO FULL SIZE OF BORE. NIPPLES SHALL CONFORM TO SIZE, WEIGHT, AND STRENGTH OF ADJOINING PIPE. WHEN LENGTH OF UNTHREADED PORTION OF NIPPLE IS LESS THAN 1-1/2" USE EXTRA STRONG NIPPLE, DO NOT USE CLOSE NIPPLES. FOR STEEL AND WROUGHT IRON PIPE, USE MALLEABLE IRON GROUND JOINT UNIONS, BLACK OR GALVANIZED, TO CONFORM TO PIPE.
2.4. ARRANGE AND INSTALL PIPING APPROXIMATELY AS INDICATED, STRAIGHT, PLUMB, AND AS DIRECT AS POSSIBLE, FORM RIGHT ANGLES ON PARALLEL LINES WITH BUILDING WALLS. KEEP PIPES CLOSE TO WALLS, PARTITIONS, AND CEILINGS, OFFSETTING ONLY WHERE NECESSARY TO FOLLOW WALLS AND AVOID INTERFERENCE WITH OTHER MECHANICAL ITEMS. LOCATE GROUPS OF PIPES PARALLEL TO EACH OTHER; SPACE AT A DISTANCE TO PERMIT APPLYING FULL INSULATION AND TO PERMIT ACCESS FOR SERVICING VALVES. PIPING TO BE RUN IN CONCEALED LOCATIONS UNLESS INDICATED EXPOSED, OR IN EQUIPMENT CONTROL VALVES, SEPARABLE WELLS, PRESSURE TAPS, AND OTHER ITEMS AS CALLED FOR THE TEMPERATURE CONTROLS.
2.5. PIPING TESTS: STEAM PIPING SYSTEMS:
2.5.1. PROVIDE TEMPORARY EQUIPMENT FOR TESTING, INCLUDING BRIDGE PIPING, PUMP AND GAUGES. TEST PIPING SYSTEM BEFORE INSULATION IS INSTALLED, AND REMOVE CONTROL DEVICES BEFORE TESTING. TEST EACH SECTION OF EACH PIPING SYSTEM INDEPENDENTLY, BUT DO NOT USE PIPING SYSTEM VALVES TO ISOLATE SECTIONS WHERE TEST PRESSURE EXCEEDS VALVE PRESSURE RATING. FILL EACH SECTION WITH WATER OR AIR AND PRESSURIZE FOR THE INDICATED PRESSURE AND TIME. REQUIRED TEST PERIOD IS 2 HOURS. TEST EACH PIPING SYSTEM AT 150% OF OPERATING PRESSURE INDICATED, BUT NOT LESS THAN 25-PSI TEST PRESSURE. OBSERVE EACH TEST SECTION FOR LEAKAGE AT END OF TEST PERIOD. TEST FAILS IF LEAKAGE IS OBSERVED OR IF PRESSURE DROP EXCEEDS 5% OF TEST PRESSURE.
2.5.2. REPAIR PIPING SYSTEMS SECTIONS THAT FAIL THE REQUIRED PIPING TEST, BY DISASSEMBLY AND REINSTALLATION, USING NEW MATERIALS TO THE EXTENT REQUIRED TO OVERCOME LEAKAGE. DO NOT USE CHEMICALS, STOP-LEAK COMPOUNDS, MASTICS, OR OTHER TEMPORARY REPAIR METHODS. DRAIN TEST WATER FROM PIPING SYSTEMS AFTER TESTING AND REPAIR WORK HAS BEEN COMPLETED.

3. VALVES:
3.1. ALL VALVES SHALL CONFORM TO ANSI STANDARD DIMENSIONS. MATERIALS FOR VALVES INCLUDING DISCS, GASKETS, PACKINGS, SEATS, DIAPHRAGMS AND LUBRICANTS SHALL CONFORM TO RECOMMENDATIONS OF THE VALVE MANUFACTURER FOR THE INTENDED USE.
3.2. VALVES FOR STEAM SERVICE (60 PSI) SHALL BE BRONZE GLOBE VALVES COMPLYING WITH MSS SP-80 FOR TIGHT SHUTOFF. VALVES 2 INCHES AND SMALLER SHALL BE 150 LB. SATURATED STEAM, RISING STEM, BRONZE BODY MEETING ASTM B62 BRONZE TRIM, STAINLESS STEEL DISC AND SEAT, UNION BONNET WITH STUFFING BOX. PROVIDE EXTENDED STEMS FOR INSULATION.
3.3. CHECK VALVES FOR WATER SHALL BE 200 LB. SATURATED STEAM, SWING TYPE, THREADED, BRONZE BODY MEETING ASTM B62, PRESSURE TIGHT REMOVABLE DISC, HINGE BUMPER TO PREVENT STICKING OPEN, CAN BE MOUNTED HORIZONTALLY OR VERTICALLY. CHECK VALVES AT DISCHARGE OF PUMPS SHALL BE NON-SLAM TYPE.

4. THERMOMETERS AND GAUGES:
4.1. PROVIDE EQUIPMENT, MATERIALS, LABOR, AND SUPERVISION NECESSARY TO INSTALL THERMOMETERS AND GAUGES. PROVIDE THERMOMETER WELLS (SAME MANUFACTURER) CONSTRUCTED OF BRASS OR STAINLESS STEEL, PRESSURE RATED TO MATCH PIPING SYSTEM DESIGN PRESSURE. PROVIDE 2" EXTENSION FOR INSULATED PIPING. PROVIDE CAP NUT WITH CHAIN FASTENED PERMANENTLY TO THERMOMETER WELL.
4.2. THERMOMETERS SHALL BE 9 IN. "ADJUST-ANGLE" INDUSTRIAL THERMOMETER, COMPLETE WITH DOUBLE THICK GLASS FRONT, WITH BLUE INDICATING LIQUID, SEPARABLE SOCKET AND ARRANGED SO THE UNIT CAN BE SET AT ANY REQUIRED ANGLE FRONT TO BACK OR LEFT TO RIGHT DURING OR AFTER INSTALLATION. RANGE 32 DEGREES F - 240 DEGREES F FOR HOT WATER, 50 DEGREES F - 400 DEGREES F FOR STEAM. THERMOMETERS SHALL BE TYPE WEISS A-78-23-1/2, ASHCROFT, U.S. GAUGE, OR APPROVED EQUIVALENT.

5. MECHANICAL IDENTIFICATION:
5.1. PROVIDE MATERIALS, EQUIPMENT LABOR AND SUPERVISION NECESSARY TO INSTALL PIPING IDENTIFICATION PRODUCTS. COMPLY WITH ANSI A13.1 FOR LETTERING SIZE, LENGTH OR COLOR FIELD, COLORS, AND INSTALLED VIEWING ANGLES OF IDENTIFICATION DEVICES. IDENTIFICATION SHALL BE W.H. BRADY, INDUSTRIAL SAFETY SUPPLY, OR SETON NAMEPLATE. PIPE MARKERS SHALL BE MANUFACTURER'S STANDARD PREPRINTED, SEMI-RIGID SNAP ON OR SELF-STICKING, COLOR-CODED PIPE MARKERS. PROVIDE FULL-BAND PIPE MARKERS, EXTENDING 360 DEGREES AROUND PIPE AT EACH LOCATION OR SELF-STICKING PIPE MARKERS. INSTALL PIPE MARKERS ON EACH SYSTEM, AND INCLUDE ARROWS TO SHOW NORMAL DIRECTION OF FLOW. LOCATE PIPE MARKERS AS FOLLOWS: WHEREVER PIPING IS EXPOSED TO VIEW, NEAR EACH VALVE AND CONTROL DEVICE, NEAR LOCATIONS WHERE PIPES PASS THROUGH WALLS, SPACED INTERMEDIATELY AT MAXIMUM SPACING OF 50' ALONG EACH PIPING RUN, EXCEPT REDUCE SPACING TO25' IN EQUIPMENT ROOM.

6. INSULATION:
6.1. ABOVE GROUND STEAM AND EQUIPMENT INSULATION SHALL BE PREFORMED, SECTIONAL, HEAVY DENSITY FIBERGLASS INSULATION, SUITABLE FOR OPERATING TEMPERATURES FROM -20 DEGREES F TO +850 DEGREES F. EQUIPPED WITH FACTORY APPLIED, ALL-SERVICE VAPOR BARRIER JACKET CONSTRUCTED OF WHITE KRAFT PAPER BONDED TO ALUMINUM FOIL REINFORCED WITH FIBERGLASS YARN, WITH PRESSURE-SENSITIVE, SELF-SEALING LONGITUDINAL LAPS AND BUTT STRIPS. THERMAL CONDUCTIVITY OF 0.23 BTU-IN/HR-FT2-OF@75O F MEAN TEMPERATURE. WATER VAPOR PERMEANCE OF 0.02 PERMS. MANVILLE "MICRO-LOK AP-T" OR APPROVED EQUIVALENT. PIPE INSULATION SCHEDULE SHALL BE AS FOLLOWS FOR SERVICE-THICKNESS-PIPE SIZES:
6.1.1. STEAM AND STEAM CONDENSATE, 1-1/2" - UP THROUGH 2" PIPE SIZE
6.1.2. STEAM AND STEAM CONDENSATE, 2" - GREATER THAN 2" UP THROUGH 6" PIPE SIZE
6.2. INSULATION JACKETS SHALL BE 20MIL HIGH IMPACT PVC SECURED WITH SPRAY CONTACT ADHESIVE. MANVILLE "ZESTON 2000" OR EQUIVALENT. FITTING AND VALVE JACKETS SHALL BE PREMOLDED PVC WITH JOINTS AND SEAMS SEALED WITH A SPRAY CONTACT ADHESIVE OR VAPOR BARRIER MASTIC. PREMOLDED JACKETS SHALL BE MANVILLE "ZESTON 2000" OR APPROVED EQUIVALENT. AT WALL PENETRATIONS AND ON EXTERIOR PIPE, PROVIDE AND ADDITIONAL JACKET OF 0.020-INCH THICK CORRUGATED ALUMINUM WITH 0.015 INCH THICK, 3/8" WIDE ALUMINUM BANDS. METAL JACKET SHALL HAVE FACTORY APPLIED MOISTURE BARRIER. FITTING AND VALVE COVERS TO B E PREFORMED OF SAME MATERIAL AS ADJACENT METAL JACKET. WHERE PVC OR METAL JACKETS ARE USED, DELETE THE FACTORY APPLIED ASJ. PIPE INSULATION SHALL CONTINUE THROUGH SLEEVES AND HANGARS WITH VAPOR BARRIER AND/OR JACKET.

7. STEAM SPECIALTIES
7.1. FLOAT AND THERMOSTATIC TRAPS SHALL HAVE HEAVY CAST IRON BODIES. FLOAT VALVE MECHANISM SHALL BE OF HEAVY BRASS AND SHALL HAVE VARIABLE LEVER RATIO TO ENSURE QUICK AND WIDE OPENING FOR DISCHARGING CONDENSATION. THERMOSTATIC BELLOWS MEMBER FOR VENTING AIR SHALL HAVE LESS THAN TEN CORRUGATIONS AND SHALL BE PROTECTED AGAINST DAMAGE FROM WATER HAMMER BY BRASS SHIELD CUP. TRAPS SHALL BE BY SPIRAX SARCO, ARMSTRONG, HOFFMAN.
7.2. STRAINERS SHALL BE OF THE Y-TYPE HAVING HEAVY CAST IRON BODIES WITH BLOW-OFF TAPPINGS IN SCREEN COVES. SIZES ½ IN. THROUGH 1-½ IN. SHALL HAVE SCREEN OF 20 MESH MONEL. SIZES 2 IN. AND OVER SHALL BE PERFORATED STAINLESS STEEL, 233 HOLES PER SQUARE INCH, WITH .045 IN. DIAMETER, .016 IN. THICK. SCREEN SHALL BE REMOVABLE WITHOUT DISTURBING PIPING.
7.3. INSTALL TRAPS FOR EACH STEM COIL, EACH END OF MAIN, AND VESSEL REQUIRING CONDENSATE DRAINAGE AND ELSEWHERE AS SHOWN ON DRAWINGS. RUNOUT FROM UNIT BEING DRAINED SHALL BE SAME SIZE AS COIL OR VESSEL DRAIN TAPPING. INSTALL GATE VALVE AND STRAINER AHEAD OF EACH TRAP, AND INSTALL UNION ON BOTH SIDES OF TRAP. SIZE TRAPS FOR TWO TIMES THE CONDENSATE RATING OF THE COIL OR VESSEL BEING DRAINED. INSTALL MULTIPLE TRAPS WHERE ONE TRAP WILL NOT HANDLE THE CONDENSATE RATING OF THE ITEM BEING DRAINED. INSTALL VALVED AND CAPPED BLOWDOWN LINE FOR EACH STRAINER.
7.4. INSTALL CONTROL VALVES, FLOW SWITCHES, TEMPERATURE, SENSOR WELLS, GAUGE TAPS, FLOW METERS, ETC., PROVIDED BY TEMPERATURE CONTROL CONTRACTOR.

8. TESTING AND BALANCING:
8.1. PROVIDE TESTING, ADJUSTMENT, AND BALANCING OF HYDRONIC AND STEAM SYSTEMS. SUBMIT COPIES OF REPORT TO THE ENGINEER.
8.2. AN INDEPENDENT, CERTIFIED TESTING AND BALANCING CONTRACTOR SHALL PERFORM TESTING AND BALANCING. THE CONTRACTOR SHALL BE CERTIFIED BY AABC, NEBB, OR SMARTA. THE BALANCING CONTRACTOR SHALL PROVIDE LABOR, SERVICES, AND TEST EQUIPMENT REQUIRED TO TEST, ADJUST, AND BALANCE THE SPECIFIED SYSTEMS. PERSONNEL INVOLVED IN THE EXECUTION OF THE WORK UNDER THE BALANCING CONTRACT SHALL BE EXPERIENCED AND TRAINED IN THE TOTAL BALANCING OF MECHANICAL SYSTEMS, AS WELL AS BEING REGULAR EMPLOYEES OF BALANCING CONTRACTOR.
8.3. HYDRONIC SYSTEMS: ADJUST TO WITHIN PLUS OR MINUS 10 PERCENT OF DESIGN. PERMANENTLY MARK SETTINGS OF VALVES AND OTHER ADJUSTMENT DEVICES ALLOWING SETTINGS TO BE RESTORED. SET MEMORY STOPS.
8.4. ADJUST WATER SYSTEMS TO PROVIDE REQUIRED OR DESIGN QUANTITIES. USE CALIBRATED FITTINGS AND PRESSURE GAUGES TO DETERMINE FLOW RATES FOR SYSTEM BALANCE. ADJUST SYSTEMS TO PROVIDE SPECIFIED PRESSURE DROPS AND FLOWS THROUGH HEAT TRANSFER ELEMENTS PRIOR TO THERMAL TESTING. PERFORM BALANCING BY MEASUREMENT OF TEMPERATURE DIFFERENTIAL IN CONJUNCTION WITH BALANCING. EFFECT SYSTEM BALANCE WITH AUTOMATIC CONTROL VALVES FULLY OPEN TO HEAT TRANSFER ELEMENTS. EFFECT ADJUSTMENT OF WATER DISTRIBUTION SYSTEMS BY MEANS OF BALANCING COCKS VALVES AND FITTINGS. DO NOT USE SERVICE OR SHUT-OFF VALVES FOR BALANCING UNLESS INDEXED FOR BALANCE POINT. WHERE AVAILABLE PUMP CAPACITY IS LESS THAN TOTAL FLOW REQUIREMENTS OR INDIVIDUAL SYSTEM PARTS, FULL FLOW IN ONE PART MAY BE SIMULATED BY TEMPORARY RESTRICTION OF FLOW TO OTHER PARTS.
8.5. ELECTRIC MOTORS DATA SHALL INCLUDE MANUFACTURER, MODEL/FRAME, HP/BHP, PHASE, VOLTAGE, AMPERAGE; NAMEPLATE, ACTUAL, NO LOAD, RPM, SERVICE FACTOR, STARTED SIZE, RATING, HEATER ELEMENT, SHEAVE MAKE/SIZE, BORE.
8.6. PUMP DATA SHALL INCLUDE IDENTIFICATION/NUMBER, MANUFACTURER, SIZE/MODEL, IMPELLER, SERVICE, DESIGN FLOW RATE, PRESSURE DROP, BHP, ACTUAL FLOW RATE, PRESSURE DROP, BHP, DISCHARGE PRESSURE SUCTION PRESSURE, TOTAL OPERATING HEAD PRESSURE, SHUT OFF, DISCHARGE AND SUCTION PRESSURES, S OFF, AND TOTAL HEAD PRESSURE.

9. GENERAL ELECTRICAL REQUIREMENTS
9.1. PROVIDE LABOR, MATERIAL, AND EQUIPMENT REQUIRED TO INSTALL ELECTRICAL WORK.
9.2. WORK SHALL CONFORM TO OR EXCEED THE MINIMUM REQUIREMENTS OF THE CURRENTLY ENFORCED EDITION OF THE NATIONAL ELECTRICAL CODE AND STATE, LOCAL, AND MUNICIPAL ORDINANCES.
9.3. SUBMITTALS SHALL BE FURNISHED FOR VFD'S.
9.4. VISIT THE EXISTING SITE AND BECOME FAMILIAR WITH THE CONDITIONS AS THEY EXIST, OR THAT WILL IN ANY MANNER AFFECT THE WORK. NO ALLOWANCE WILL BE MADE SUBSEQUENTLY, IN THIS CONNECTION, ON THE BEHALF OF THE CONTRACTORS FOR ANY ERROR OR NEGLIGENCE ON THEIR PART.
9.5. MATERIALS SHALL BE NEW, COMPLETE WITH MANUFACTURER'S GUARANTEE OR WARRANTY. MATERIAL SHALL BE AS LISTED BY UNDERWRITERS' LABORATORIES, INC., IF A STANDARD HAS BEEN ESTABLISHED BY THE AGENCY FOR THE TYPE OF MATERIAL.
9.6. WHEN CHANGES REQUIRE SHUT_DOWN OF ELECTRICAL SERVICES, THE CONTRACTOR SHALL NOTIFY THE OWNER, PROPER BUILDING AUTHORITIES, OR OWNER'S REPRESENTATIVE NOT LESS THAN 72 HOURS IN ADVANCE AND OBTAIN APPROVAL FROM THESE AUTHORITIES BEFORE MAKING CHANGES.
9.7. COLOR CODING OF WIRING SHALL MATCH EXISTING. GROUND WIRES SHALL BE GREEN OR BARE COPPER WHERE PERMITTED.

10. DEMOLITION
10.1. REMOVE ELECTRICAL SERVICES AND ASSOCIATED ITEMS AS REQUIRED AND AS SHOWN ON DRAWINGS.
10.2. PROTECT ADJACENT AREAS BEFORE, DURING AND FOLLOWING REMOVAL OPERATIONS.
10.3. EXISTING EQUIPMENT NOT REUSED OR RETAINED BY THE OWNER SHALL BE REMOVED FROM THE PREMISES BY THE CONTRACTOR.

11. CONDUIT
11.1. WHERE CONNECTIONS ARE MADE TO VIBRATING EQUIPMENT, FLEXIBLE STEEL CONDUIT WITH APPROPRIATE FITTINGS SHALL BE USED. IN WET LOCATIONS, USE LIQUID-TIGHT FLEXIBLE STEEL CONDUIT.
11.2. CONDUIT MAY BE EMT WITH COMPRESSION TYPE STEEL FITTINGS.
11.3. CONDUIT RUNS ARE NOT SHOWN TO ALLOW THE CONTRACTORS TO CHOOSE THEIR OWN ROUTE TO VARIOUS ELECTRICAL EQUIPMENT AND DEVICES. HOWEVER, CARE SHALL BE TAKEN TO COORDINATE THE CONDUIT RUNS WITH EXISTING CONDITIONS AND WORK TO BE INSTALLED BY OTHER TRADES.
11.4. HOLES OR VOIDS USED TO EXTEND CONDUIT OR WIRING THROUGH FIRE RATED FLOORS AND WALLS SHALL BE SEALED WITH A FIRE RESISTANT FOAM SEALANT TO PREVENT THE PASSAGE OF SMOKE, FIRE, TOXIC GAS OR WATER THROUGH THE PENETRATION EITHER BEFORE, DURING OR AFTER A FIRE.
11.5. CONDUIT SHALL NOT BE USED AS THE SOLE GROUNDING MEANS.

12. WIRE
12.1. CONDUCTORS USED THROUGHOUT THIS PROJECT SHALL BE COPPER TYPE THHN/THWN WITH 600V INSULATION.
12.2. CONDUCTORS #8 AND LARGER SHALL BE STRANDED.
12.3. WIRING SHALL BE IN CONDUIT OR APPROVED RACEWAYS.

13. GROUNDING
13.1. THE ELECTRICAL SYSTEM GROUND SHALL CONFORM TO THE REQUIREMENTS OF THE NATIONAL ELECTRICAL CODE.
13.2. THE EQUIPMENT GROUNDING SYSTEM SHALL GROUND ELECTRICAL EQUIPMENT, PANELBOARDS, STARTERS, AND METAL NON_CURRENT CARRYING PARTS OF ELECTRICAL EQUIPMENT AND RACEWAYS.
13.3. A GROUNDING CONDUCTOR SHALL BE RUN IN THE RACEWAY, WITH THE CURRENT CARRYING CONDUCTOR.

14. VARIABLE SPEED MOTOR CONTROLLERS
14.1. VARIABLE SPEED MOTOR CONTROLLERS SHALL BE AS MANUFACTURED BY ABB.
14.2. VARIABLE SPEED MOTOR CONTROLLERS SHALL COMPLY WITH IEEE STANDARD 519.
14.3. VARIABLE SPEED MOTOR CONTROLLERS SHALL HAVE THE FOLLOWING FEATURES;
14.3.1. RATED FOR 480V/3 MOTOR
14.3.2. DOOR INTERLOCKED DISCONNECT SWITCH
14.3.3. NEMA 3R ENCLOSURE
14.3.4. MANUAL CONTACTOR BYPASS FOR ACROSS THE LINE CONNECTION OF MOTORS
14.3.5. INVERTER/LINE SELECTOR SWITCH
14.3.6. ELECTRONIC OVERLOAD RELAYS
14.3.7. SHORT CIRCUIT PROTECTION
14.3.8. UNDER/OVER VOLTAGE PROTECTION
14.3.9. AUTOMATIC RESTART AFTER A POWER OUTAGE
14.3.10. TRANSDUCER FOR 4-20 mA AND 0-10 V UNGROUNDED SIGNALS
14.3.11. POWER ON PILOT LIGHT
14.3.12. LCD DISPLAY OF SPEED, VOLTAGE, AMPS, AND OTHER DRIVE PARAMETERS
14.4. VARIABLE SPEED MOTOR CONTROLLERS SHALL BE BASED UPON IGBT TECHNOLOGY
14.5. PROVIDE INPUT POWER FACTOR CORRECTION TO ACHIEVE 95% MINIMUM AT MAXIMUM OUTPUT.

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KEY PLAN

DRAWN	JDN
APPROVED	JDN
ISSUED FOR	CONSTRUCTION DOCUMENTS
DATE	12/19/2014
FIELD BOOK	
PROJECT NO.:	414378-0

MECHANICAL & ELECTRICAL DEMO AND NEW WORK PLANS, SCHEDULES & SPECIFICATIONS

ME1.01